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GEELONG NATURALIST

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G.F.N.C.
P.O. Box 1047, Geelong

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Editorial

I have been re-reading with interest some of the early issues of the *Geelong Naturalist.*

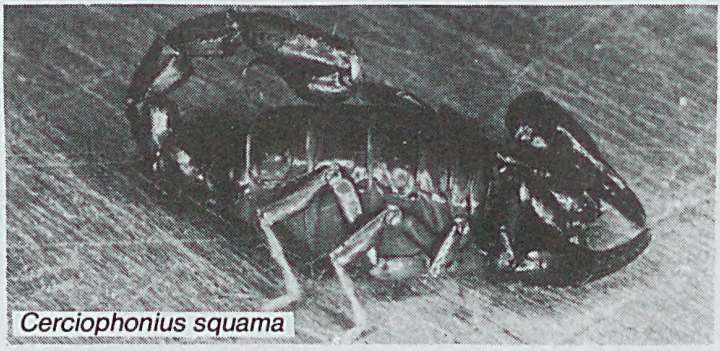
The very first one (April 1964) includes a progress report by Jack Wheeler of the work and the public appeal for funds of a Committee for a proposed Bellarine National Park (Cuthbertsons). The National Park did not eventuate, but the Ocean Grove Nature Reserve did, largely as the result of Jack Wheeler's efforts. He was backed by the Club and by state and local governments (the Mayor of Geelong was chairman of the Committee). The vision, however, came from Jack, who was prepared to take risks and openly push for the causes in which he believed.

An article in vol. 4 no. 1, of April 1967, "A bird in the hand", by C.J. Gibson, complements Lou Lane's account of the aboriginal use of local plants, "Fifty useful plants', which continues in this issue. C.J. Gibson was writing about birds hunted for food by Victorian aborigines.

Those early *Naturalists* reinforced what I already knew: that in the Geelong region we have a tremendous wealth and variety of natural history subjects to enjoy and study. There is such a wide range of environments - the bays, the oceans, the river and lake wetlands, treeless volcanic plains, wet and dry sclerophyll forests, botanically rich heathlands, dry mallee, muddy mangroves, shifting sand dunes, granite, sandstone, greenstone, limestone. We can see more than 100 bird species in a single day, we can find rare and endangered birds if we know when and where to look. In spring there is a profusion of orchids and other wildflowers in bloom. We don't have to go far to see kangaroos or koalas in their natural habitat. There are still platypus in our rivers.

The Club has received a grant to produce a publication about significant natural history areas in the Geelong region. The Committee would like your suggestions about which places should be included.

Valda Dedman



Cerciophonius squama

Photo: D. King

Record & Biological Notes of a Scorpion Found in the Geelong Region

by Dave King

Introduction

Searching for invertebrates under fallen timber, during a visit to the Ocean Grove Nature Reserve, a scorpion was found that differed from the area's more common Marbled Scorpion, *Lychus marmoreus*. The subject specimen was distinguished mainly by the fact that it was slightly larger than *L. marmoreus* and the general markings were not so checkered, but more uniformly dark brown on the chitonous sclerites and carapace. Close examination of the specimen determined it to be *Cerciophonius squama (Bothriuridae)*.

Scorpions are of an ancient Order, having been around in essentially their present form for some 350 million years (Grey 1971). Originally they were present in aquatic habitats; terrestrial forms appearing in the fossil record of the Carboniferous, (Barnes, 1980). *Cerciophonius* are an ancient stock with forms in both Australia and South America, (Koch, 1977). *C. squama* is confined to the south-eastern sector of the Australian mainland and Tasmania, and nocturnal in habit. Koch, 1977, states that *C. squama* favours habitat containing trees such as *Casuarina*, with an average annual rainfall and temperature criteria above 250mm and below 24°C respectively.

Form

The basic form of *C. squama* is that common to all members of the Order *Scorpiones*, shown in Fig. 1. Size in this specimen is 35mm from the mandibles to the tip of the outstretched postabdomen. This is not large in respect of scorpions generally, tropical and sub-tropical species often being larger. It is possessed of four pairs of walking legs, a pair of pedipalps ending in a pincer used for grasping, a postabdomen with five narrow articulated segments terminating in a stinging apparatus, and ventrally a pair of unique sensory organs, the pectines, Fig. 2C.

Each walking leg has a fused tarsus terminating in a pretarsus with two claws that are without any form of claw-teeth. The fingers of each pedipalp pincer have numerous small blunt peg-like teeth arranged along the opposing edges. Fig. 2A. Function of the pectines has not been elucidated, other than they are chemosensory. Situated as they are on the ventral surface they must relay information regarding the nature of the substrate. Since activity is always nocturnal, it is suggested by the writer that the pectines could be instrumental in aiding the scorpion to locate tracks of prey, potential mates and to pilot return to its retreat.

Sexual dimorphism is not outwardly marked in *C. squama*. Genitalia in both sexes are secluded beneath the genital operculum.

Nutrition

Scorpions, predatory creatures feeding on a wide variety of arthropods, seize their prey with the chelae and subdue it by striking with the sting in an overhead motion. Using the mandibiles, pieces of the prey are torn off and passed into the space between the chelicerae and the pedipalp coxa. Fig. 1C and 2D. Here maceration takes place with enzymes secreted from the gut, such that much of the tissue is reduced to a predigested liquid form that can be readily consumed.

Excretion

Excretion process is generally the same as all other arachnids (spiders, mites, etc.) where water retention is vital for survival. Nitrogenous waste in the form of ammonia is highly toxic unless well diluted with water. To avoid this water loss the waste is excreted largely as uric acid, insoluble in water. Water in the waste is re-absorbed through the rectum wall and through organs termed the Malpighian tubule.

Respiration

Respiration or gas exchange is maintained through spiracles, small openings in the ventral sclerites, Fig. 1C, leading to book-lungs. The book-lung is a lamination of tissue carrying the blood and separated by air spaces connected to the spiracles. Exchange of carbon dioxide and oxygen is affected by diffusion across the tissue membrane. For this process to proceed the membrane must be moist, and therefore, dehydration is fatal.

Vision

In *C. squama* eight eyes are present. A pair of median eyes are positioned in an optical tubicule situated on the dorsal surface of the carapace, closer to the anterior than the posterior edge of the carapace, a diagnostic feature. Two groups of three eyes are on each side at the edge of the carapace in the anterior-lateral position, Fig. 1A and B. None of the eyes would be capable of forming a distinct image, only a degree of illumination and movement would be detected. Being of nocturnal habit this is probably all that is necessary for survival.

Reproduction

Male and female grasp each other by locking their chela together, at the same time performing a ritualistic dance to and fro. Eventually the male deposits a spermatophore on the substrate, and manoeuvres the female over it in such a manner that the spermatophore releases sperm into the genital opening or gonopore of the female, normally closed by the genital operculum. Fig. 1C.

The eggs contained in the female are fertilized via a series of tubules to which numerous diverticula or blind tubes are attached, each secretes an egg. The

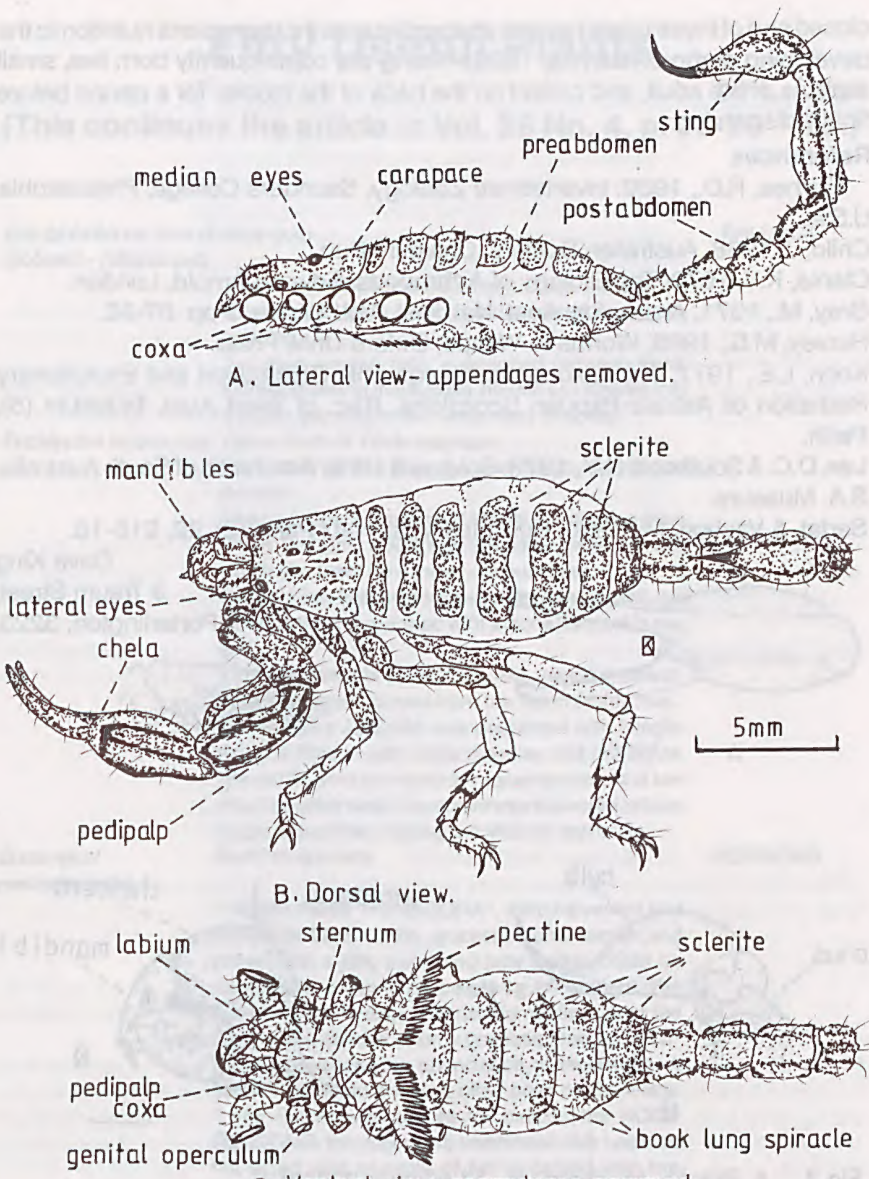


Fig.1 Cerciophonius squama (Bothriuridae).

closed end of these tubes have an absorptive area that transports nutrition to the developing embryo. (Barnes, 1980). Young are consequently born live, small replicas of the adult, and collect on the back of the mother for a period before finally dispersing.

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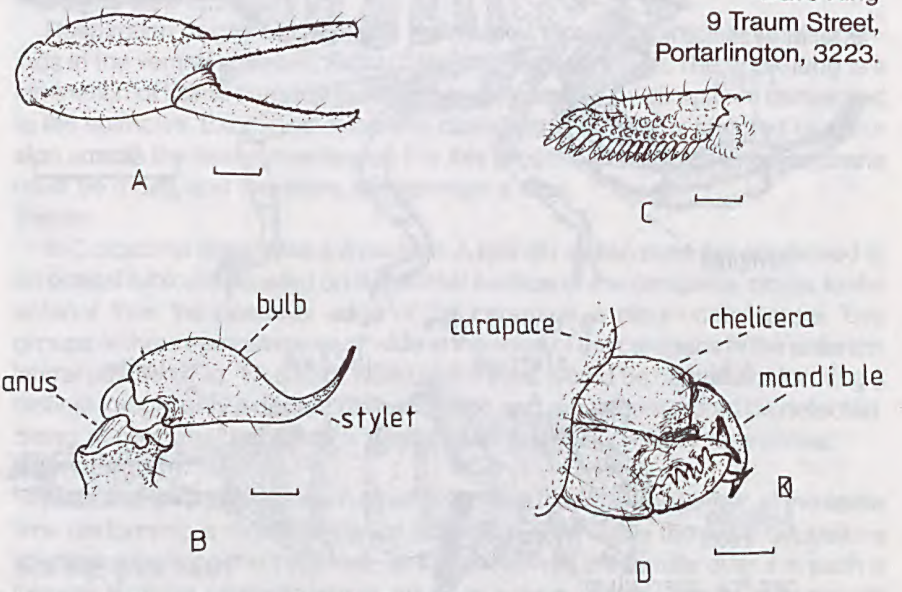

Fig.2 A, Pincer or chela; B, Stinging apparatus; C, Pectine sensory process; D, chelicery and mandibles. Scales 1mm.

Fifty Useful Plants

by L. Lane

(This continues the article in Vol. 28 No. 4, p. 75-79 - Ed.)

Euc. globulus var. pseudo globulus - (Gippsland) Blue-gum — BALLOCK

The inner bark supplied strong fibres suitable for spinning and twilling thick cordage used for animal-trapping.

Two long, coarse nets, suspended between trees, funnelled fleeing marsupials, harried by Hunters, into a cul de sac where they were easy to spear.

Eucalyptus leucoxylon Yellow Gum or White iron-bark

The timber of this tree was very tough, strong and durable.

* It was sought for making KAN:AN, the digging-stick which was the Aborginal Woman's principal tool which she used for a variety of purposes.

The pole was further indurated over a low fire and, not infrequently, it was armed with a stone flake set in one end.

* Parrying-shields called GEE:AM, used for deflecting spears were carved from the wood of this tree. Sometimes a GEE:AM was decorated with intaglio designs filled in with white pipeclay and red ochre. The motifs were carved to the accompaniment of low chanting, after which the shield was expected to have magical qualities, making the Warrior invincible.

Eucalyptus macrorhyncus Red Stringy-bark — KORRONG

* Seeds, called "YANGOORA", were harvested and stored for food, which, processed on a mortar and mixed with a little water and fatty matter, could be formed into a loaf to be baked on the embers. The natives of the Western district did not live under the regime of a seed-economy because their Tribal-territories produced an abundance of foodstuffs. A scone-loaf would not have often been on the menu.

* The timber was sought for making the KOO:-JER:OONG, the decorated, ceremonial club because the wood was capable of being carved with the LANG:WALERT, a gouge made from the lower jaw of a possum, mounted on a handle.

* Panels of red stringybark were stripped to make breakwinds, the shelters called KORRONGIU.

* Long panels stripped from these particular trees served as hulls for water-craft.
The inner side of the bark strip, that nearest the cambium-layer of the trunk, was heated over a low fire. While hot, the panel was bent and set in a specially dug earthern pit. In this "clamp" it rested while the oleo-resins set. The bent-wood hull was either tied or laced with cordage made from the inner-bark of the same tree and, finally, sealed with a mixture of clay and wattle-gum.
Note: - With an economy of linguistic terms, the water-craft was named after the tree .... the precise meaning of the expression could be deduced from the context in which it was spoken.

Eucalyptus ovata Swamp gum YARRABIL
The timber of this tree was not of good quality. Hollow logs, being relatively light, were hauled to the camping-station for the community fire by which the Clan socialized after nightfall. Branches were used for frames for shelter-dwellings. The wood was easy to cut with a chopper chopping-tool made from a suitable pebble.
The seeds were edible when other foodstuffs were scarce.

Eucalyptus sideroxylon Red iron-bark NGANGAHOOK
Economically and spiritually, this tree had significance for the Tribespeople of the Western District of Victoria. The Families who owned the stands of red iron-barks were wealthy, indeed.
* The extremely tough timber was suitable for making bent-wood handles for heavy percussion-tools. Slabs of iron-bark were tradeable whenever Clans assembled for CORROBOREE.

* Fibres from the integument, particularly the bast-layer, made excellent cordage for manufacturing tough and durable nets.

* The seeds of the iron-bark were the principal food of the bronze-wing pigeons. The birds were caught in drop-nets or slain with missile-sticks. The gleaming feathers were used for decorating ceremonial regalia - the poultry went straight to the cooking-hearth.

* The seeds were also harvested for human consumption after the patient ants had gathered them, one by one, from the litter-mat on the forest floor. They were yandied to separate them from the dust and stored in tightly-woven baskets which had been slathered in clay to render them waterproof. No-one liked gum-seeds very much for they were bitter - but they were saved against a time of want or the day when it was too wet to forage successfully.

* Seed-cases were used as personal ornaments, tied to the locks of a maiden's hair so that her fringe would, modestly, conceal her eyes. It was unlawful for grown Men to look at a MUNDIX. Unmarried Girls

were not supposed to stare at Men. The fringe, weighted with gum-nuts was a practical compromise

* Medicine for headaches was provided by heating leaves from the iron-bark tree over hot ashes & embers. The patient inhaled the redolent steam.

* Backaches were eased by creating a medical couch. Red-hot sand & ashes were shovelled into the bottom of a pit with the WANGAT. A thick 'mattress' of iron-bark twigs-of-leaves was stacked onto the heating-element. Sufferers lay on the couch covered with kangaroo skin rugs to cause them to perspire .

* Aboriginal people who lived in the vicinity of stands of NGANGAHOOK practised the cult of sepulchres in these special trees. Mourners clustered about the trunk, gashing their scalps and thighs with stone knives or bone scalpels, all the while keening .... but .... always realists, they used leaves from the burial-tree as styptic for the self-inflicted wounds.

Eucalyptus viminalis Manna gum BEAL

* Sugary "shells" of mannitol made by the larvae of the Leaf-hopper (plus the insects, themselves) were harvested as the sweet element scarce in Aboriginal diet except for fruit-sugars.

* The sap, exuded when the cortex of leaves and stems are attacked by leaf-hoppers, contains mannitol, also. When this dried and solidified, it was shed by the trees. Stands of manna-gum were owned by particular Families and, in season, the elderly Clan-members went to harvest the precious sweet.

The Old-ones belaboured the boughs with long sticks to loosen the sugar-quills, then picked them from under each tree.

* As a side-benefit, flocks of quails assembled to eat the sweet-stuff. Stunned with a WIRRA:WIRRA, the throwing-stick, the birds were cleaved to the spine and opened out like a butterfly pork-cut.

Seared over glowing coals to seal in the body-juices, then covered with hot ashes, the feathers charred, forming air-tight "lids" under which the poultry broiled .... The feathers stripped off easily when the feast was cooked.

The quail-crops, full of sugar, were reserved for the gerontocracy.

Exocarpus cupressiformis Native cherry BALLOT or BALLART

The swollen, red pedicel of the fruit provided a tasty morsel. This was probably consumed at the tree - such foods were seldom carried home in the DHILLI - unless there were an elderly Person who yearned for the food but who was unable to travel.

Grevillea rosmarinifolia Rosemary grevillea

The entire flower-spike was consumed for the honey-content, or it was mashed in a solute of gum and water to sweeten the beverage.

Helichyrsum semi papposum	Clustered everlasting Tufts were carried in the dhilli when travelling to shift camp - to facilitate fire-lighting.	NERINGNERIT
Juncus pallidus	Pallid reed * Pith of this reed was used as decoration for the hair by both male and female Tribespeople. * Leaves were split, parched, reconstituted by being soaked in water & used in the weft of fuegoan-stitch basket-ware, in association with bulrush fibres to create a contrasting pattern in the textile. Please refer to "Lepidosperma"	TOOLIM
Kennedia prostrata	Running Postman The tough main-streams of this crawling-vine were stripped of lateral growth to be used as emergency binding. e.g. to cross a river or a lake, a pile of bark was roughly bound with NALI. A spear was thrust through the middle to pin the bark sheets together and to form a (keel) stabilizer. Babies and goods were ferried on this "instant" raft, pushed by two swimming adults.	NALI
Lepidosperma laterale	Variable sword-sedge This particular sedge was sought by the Hearth-Wives if they wished to create rigid basket-creels for storing frail belongings like their feather-ornaments in the WILLUM. The leaves were split into strips and dried. When the sap had evaporated, flexibility was restored by soaking the threads in running water. A handful of these stiff fibres constituted the wrap of the fabric. Threads of bulrush and pallid-reed fibres were worked in fuegoan-stitch to create a pattern of constrasting colour. The creel was sometimes used to dredge through sand to harvest cockles. The WORINYALOKE Women-folk would not find any need to so use their stiff sieves when they were camped inland, of course, but, having transported their treasures to Port Phillip Bay, via Little River, for the summer season, they might have been used to harvest the denizens of the sandy shore.	POOJ:NGOORT
Leptospermum juniperinum	Prickly tea-tree An infusion of crushed leaves of this shrub was specific medicine for the common cold.	CURR'N:- CURR'N:UP
Melaleuca ericifolia	Swamp Paper-bark This plant was important for Tribal-hunters .... A sapling of this plant was uprooted. The stout root-stock was utilized as the business-end of the WURRA-	KOW:ANO

WURRA, an everyday, unadorned, multipurpose implement - club, digging-stick & missile.
It was cast horizontally and flew, revolving round the heavy knob which had been crafted by the char-and-scrape method. This implement could bring down many birds of a flock which had been feeding on the ground. The thin haft could be used as lever to move heavy objects or excavate roots.

Melaleuca lanceolata Moonah (We have adopted the Aboriginal name) MOONAH
The pinkish inner bark from the small tree was useful for swaddling the New Infant in the COOLAMON ..... or for wrapping small items of food into a parcel, tied with string. Fingerlings and tadpoles, which would shrivel up on a coal-grill were wrapped in plant-foil. At supper, the parcel was slashed open at the top. The stew could be lifted out with a TIMBOON a mussel-shell used like a spoon or fingers were made before spoons.

Microtis unifolia Common onion-orchid
Bulb eaten raw or cooked. Either way, the pungent flavour was relished.

Muehlenbeckia adpressa Climbing lignum

* Buds of polygnum were edible in spring. They were tasty and full of vitamins as all shoots are. * Seeds also harvested.
* As a side benefit: the longicorn beetles which infest the stems and root-stocks of this shrub, pupated under the soil. The imago was a food-crop much anticipated - oil-rich nutriment in soft food that small children could masticate.

Panicum effusum Hairy picnic-grass
Millet-like grains harvested in season - a rich food-stuff.

Pelargonium rodneyanum Magenta stork-bill
Small roots excavated for the evening-meal cooked vegetable.

Pimelea axifolia Bootlace bush BONANG
* The bark peeled off in thin strips. This was used as emergency cordage and, more importantly, as ligatures for deep wounds on the limbs.
* As a medicament, a plait of bark strips was bound around the neck to cure a sore throat.

Pimelea humilis Common rice-flower WICKERICK
Good kindling was a valuable commodity to people whose main technical tool was fire. Various pimelea-blossoms afforded light, inflammable material easily available for fire-lighting. Most carry-alls could produce some WICKERICK on demand.

Poa labillardieri	Tussock-grass	BOWAT
Poa sieberiana	Common Tussock-grass The thin leaves of this ubiquitous forb were selected for making fine string. The leaves were pounded on a netherstone until the fibres were separated. The flocked rove was spun and twilled in the usual manner, after being blended with possum or native-cat fur. Females sometimes owned a small bag called a BALLANG-OWAT, made of Poa and fur, just big enough to contain her bone needles and her necklaces.	
Prostanthera nivea	Snowy mint-bush * The foliage of this plant was used to mask foodstuffs being lowered into an earth-oven lined with hot stones. The whole was covered with a clay lid. Water was introduced during the cooking process to obtain a "pressure-cooker effect". The plant prevented the meat from being scorched and, at the same time, flavoured the food. * The greenery was administered, as an abortificant, to advance a difficult or a protracted labour.	
Pteridium esculentum	Common bracken This was a vegetable-staple of the Aboriginal diet. * The shoots, in the crozier-stage were eaten .... Bracken is frequently the first green-food to recover after bush-fire. * The roots were dug with the yam-pole and cooked in ashes in the most common accompaniment to protein-foods. * Sometimes, roots were parched, slowly, and carried as iron-rations by a BIHAR, the Tribal-messenger, who undertook a long journey.	MOOLAA
Rhagodia baccata	Seaberry salt-bush Salty-sweet, red shoots of this bush are edible in season.	NARETHA
Romulea longifolia	Onion-grass The roots of this liiy were good food.	
Rumex brownii	*Slender dock* ** The root was administered as a gentle laxative and a general tonic. * Seeds also eaten.* ** The leaves chewed and used as a poultice on skin-sores.*	*KADTHE:-KADTHEK*
Solanum laciniatum	Kangaroo-apple The round fruits were baked in ashes until the rinds split. The pulp & seeds were scraped out with a TIMBOO, a mussel-shell. This food was extremely astringent. It could only be consumed in small quantities. If the diner ate too	GOONYANG

	much of the comestible the mouth was ulcerated .. Notwithstanding this disadvantage, Kangaroo-apples were often eaten.	
(Sonchus asper)	Rough thistle * The stalks were eaten as a tonic. * The bitter, milky latex was applied over a small wound or a sore as a false skin. Note: - It is theorized that one of the thistles which infest the Australian country-side may have been indigenous, because the names, THALAAK, DALURP & BRUGL:BRUGL, were used by the People of three indepent Tribes by the time that R.B. Smyth's official tome was published in 1878. Enquiries for the word-lists in the book commenced as early as 1868, say, thirty years after Batman's landing.	THALAAK
Themeda australis	Kangaroo-grass * The grain of this cereal was harvested in season. They were a rich source of nourishment, of which the Tribes-people were deprived once foreign domestic animals began to graze. Sheep and cattle ate it out * After the ripe grain was beaten out of the grass, the whole plant was pulled out and stripped for making soft string. The flocked rove was spun and twilled in the usual manner. The fine thread was used for the small neck-reticule the Men wore for secreting their personal treasures, such as their "lucky-stone" or talisman wrapped up in yards of Poa string so that nobody should set their eyes upon it, plus, perhaps, some quality knapping-stone he intended to swap with his Trading-partner from another Clan. Often the string to be worked into the netting was dyed or coloured with red or yellow ochre, the rows worked in alternate colours for a fancy effect.	
Typha domingensis	Common bulrush * After the Foragers had had some merriment squatting in the swamp rooting out bulrushes, great armfuls were burnt over flames. This removed the green integument from the strap like leaves of the rushes. The leaves were split and hung up to parch. * The rhizomes were now belaboured with the KULKI-muller, much as we hammer steak to make it tender. They were buried in ashes near the cooking-fire. The farinaceous matter was chewed out when they were done. It was bland, starchy food, not very tasty but a suitable comestible for growing children. * The stringy part which they spat into the WANGAT was combed straight with a TIMBOO, the fresh-water mussel-shell.	CUMBUNGI

Once it was carded, it was spun and twined for cordage.

* The split leaves, quite dark after their scorching, were soaked to make them pliable. A KAL:UP, the bone bodkin was employed to make spaces in the fabric so that the butt-end of the bulrush could be passed through. The bulrush-threads were alternated with threads of pallid rush to create a patterned surface.

See: Lepidosperma.

While the listed plants of the You Yangs would have been utilized as shown in this table, the author does not pretend that the Aboriginal-language terms are all from WATHAURWURRU.

The Rev. John Bulmer, Superintendent of the Aboriginal Mission-station at Lake Tyers, in Gippsland; Mr. John Green, in charge of Coranderrk; Mr. Joseph Shaw from the Aboriginal Reserve at Lake Condah; and the Rev. Mr. Hartmann of Lake Hindmarsh all set down a list of plants which the Aborigines under their care were in the habit of using, with the names by the Tribespeople referred to them.

Samples were submitted to Baron von Mueller C.M.G., F.R.S., the Government Botanist who is famous for having established the Botanical Gardens on South Yarra. Von Mueller identified the plants and his lists were published in R. Brough Smyth's tome, "Victorian Aborigines" in 1878.

Our local Aborigines, the Clans of the WATHAURUNG-Tribe, would have understood the names of the plants from Coranderrk; for the WATHAURUNG, the WOIWORUNG & the BUNURONG, whose territories bordered Port Phillip Bay, were a Confederacy of Tribes who called themselves the KULIN. Each Tribe understood the languages of the other two .

The terms from Lake Condah & Lake Hindmarsh, far to the west, & Lake Tyers in the remoteness of Gippsland would have puzzled them for the language of the Tribes in all three places was distinctly different to their own.

The author ventures to include some of these "foreign" designations because details of our local Tribespeople's language was not recorded with sufficient diligence before they became extinct. We know little of their tongue.

By the time Robert Brough Smyth was appointed Secretary to the Board for the Protection of the Aborigines, in 1868, and he began to collect information about the Indigenes of Victoria, the merest remnant of the "Barrarbool" Tribe survived.

George Augustus Robinson, the Chief Protector of the Victorian Aborigines, described the WATHAURUNG as numerous & powerful in 1840 but, by 1868, their numbers had been reduced to five confused, de-tribalized males and one lone female. She was destined to die within the year.

By the time "Victorian Aborigines" was published, in 1878, four of the Tribesmen had passed from the earth. Only one was left.

Those WATHAURUNG-terms which have been preserved are just as strange and beautiful as other Victorian tribal language words so, when local terms were not available, the author has "borrowed" from Smyth's tables.

No-one is quite sure, anyway, how much the original spoken words may have been subtly altered by being forced into the straight-jacket of an alien language spelling.

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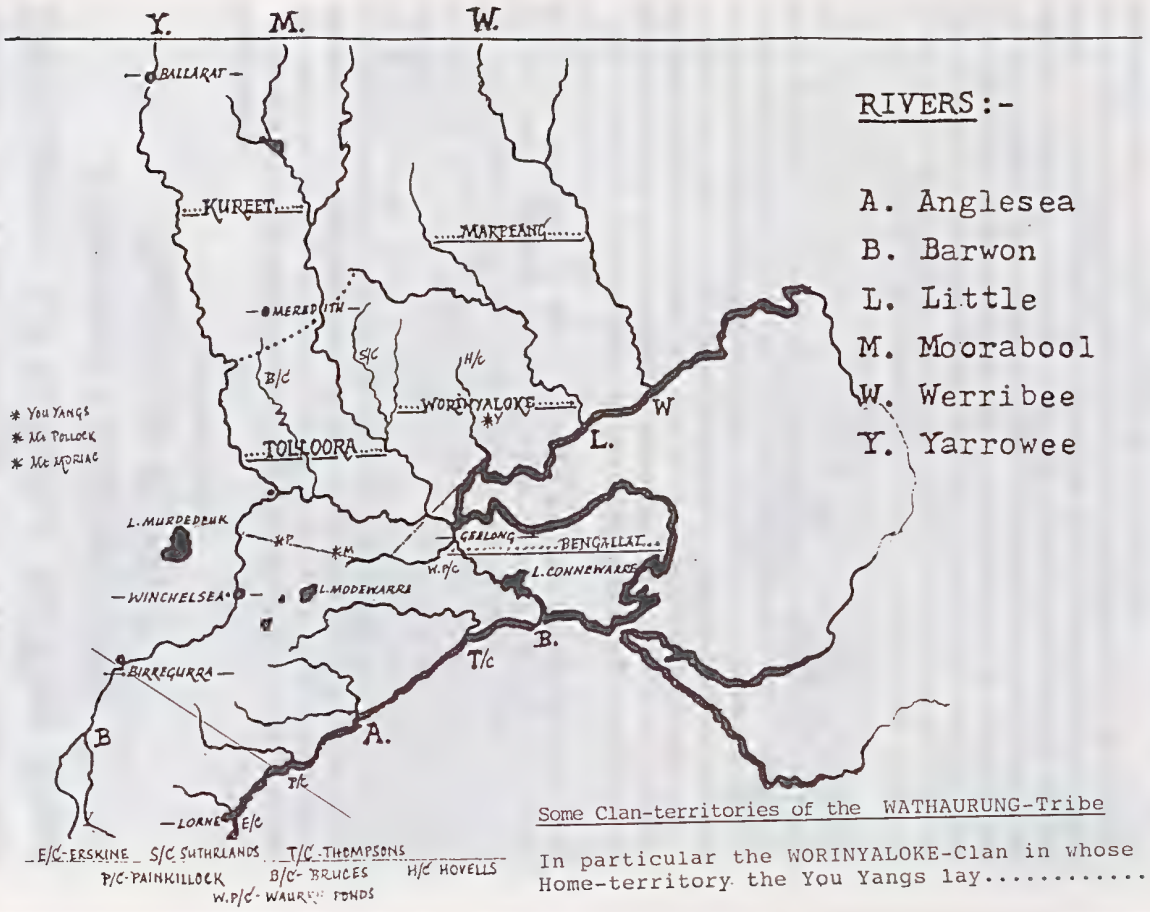
Barkly St.,
East Geelong



Some Clan-territories of the WATHAURUNG-Tribe

In particular the WORINYALOKE-Clan in whose Home-territory the You Yangs lay.....

What Is The Cause Of The Marked Deficiency Of Rainfall In The Area Between Geelong and Bacchus Marsh?

by Dave King

Introduction

The object of this investigation is to define the cause of an average rainfall, markedly less than the surrounding region, in the area between the towns of Geelong and Bacchus Marsh, known as the Werribee Plains. The usual reason put forward is that the area lies in the rain shadow created by the Otway Ranges, Fig. 1. However, the writer considers that these Ranges, whilst having some influence, are not necessarily the main cause or for that matter the only cause. This argument is based on the fact that the Otways are some 160km from the Werribee Plains, and that they are not of great extent in length or depth, and the average height of 300m is not great. In addition much of the country surrounding the Werribee Plains is also in the lee of the Otways without suffering the same deficiency in rainfall.

The location of the Werribee Plains lies between Geelong in the south and Bacchus Marsh in the north and may be considered to fall within the 500mm isohyet, and between latitudes 30° - 0'S and 37° - 42'S, and longitudes 144° - 10'E and 144° - 36'E. In general the area is gently undulating country originally of coalescing basalt flows from a number of volcanic sources now represented as weathered cones. One prominent feature, the You Yangs, is a granite outcropping that rises to a maximum height of 350m. The Plain is surrounded by higher ground to the west and north, and by relatively low ground to the south, and Bass Strait some 45km distant. To the east lies Port Phillip Bay.

Only one township of any size, Lara, lies within the area, there being four others situated on the fringes to the north and east. Grazing is the main industry of the area, with some market gardening in the north-east portion near Werribee River from which irrigation water is used. The Werribee River flows through the Plain from areas of higher rainfall and therefore provides sufficient water for the irrigation. Farms and homesteads in the other parts of the Plains rely on local rainfall for their needs. Difficulties have arisen on a number of occasions when lack of sufficient rainfall has necessitated the carting of water to maintain supplies. Bore water in the area is usually of a saline nature.

In investigating the cause of the rainfall deficiency it was decided to utilize, as a basis, the reasonably comprehensive record of meteorological data recorded

Fig.1 Werribee Plains, surrounding areas and weather recording stations.

at the Ford Motor Company's Vehicle Proving Ground facility, situated within the Werribee Plains. This data covered a period from September, 1973 up to July, 1976. The data covers, on a daily basis, during the working week, the rainfall, wind speed and direction, screen temperature and relative humidity. This, of course, meant that most week-ends and public holidays no data was recorded, other than the total rainfall for that period. Although this provided somewhat disjointed data, it detracts very little from the point of this particular exercise because the rainfall is recorded in total.

Most other data for the area is in the form of rainfall averages from stations situated around the fringes of the area and in surrounding areas. A number of the Ford Company personnel were interviewed to determine the type of rainfall that most commonly occurs in the region, i.e. whether it be drizzle, prolonged rain of light character or periodic showers of a relatively heavy nature but short duration. To complement this data an extensive research was made into synoptic charts and general meteorological data published in the local daily newspaper over the same period from September, 1973 to July, 1976.

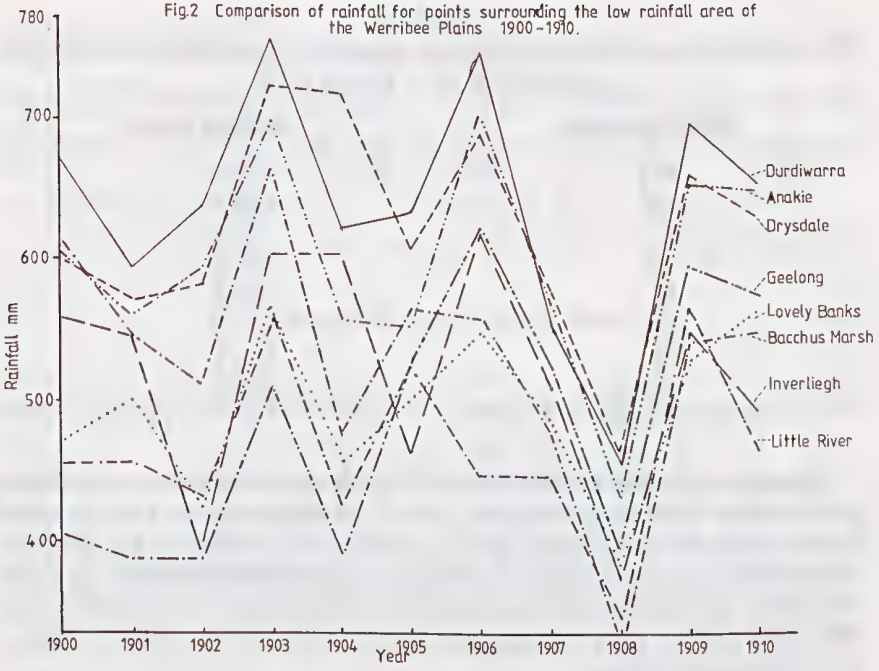
From this data it was intended to extract relevant information that would indicate the wind direction, and general meteorological conditions that provide the rainfall over the Werribee Plains. Together with the published findings of other workers in similar fields it was hoped to find some mechanism peculiar to this region that might cause the effect of the rainfall deficiency that is comparable with more arid sections of the State, such as the Mallee.

Procedure

As an indication of the rainfall being experienced over the period 1973 to 1976, data was obtained from recording instruments operated by the Ford Motor Company at their vehicle proving ground. The data recorded consisted of rainfall measured in a standard rain gauge, plus a temperature and relative humidity recording instrument housed in a Stevenson screen. In addition, wind speed and direction was also measured by a propeller type anemometer and direction sensor.

These recording instruments were situated on an open and level site at an elevation of 98m above mean sea level, and approximately two kilometres north east of the You Yang outcrop. The main influence exerted by this elevated outcrop is when winds are from the south east. This wind direction would tend to place the recording instruments in the lee of the You Yangs, as indicated on the map, Fig. 1.

In order to determine the general profile of the topography traversed by the winds blowing from each of the eight major points of the compass, lines were drawn from the position of the Ford recording station, and the contour heights noted. From this data the profiles where constructed as shown in Figs. 2-9.



From these profiles it was intended to find some correlation with the advent of rain on the Werribee Plains and at the same time relate it to the records of wind direction and rainfall recorded at the Geelong weather station and reported in the daily press, i.e. the Geelong Advertiser. In this way it was intended to find a relationship with rainfall and wind direction in Geelong with that of the Ford station, both of which would be traversed at the same time by winds having been affected by the Otway Ranges. That is, Geelong and the Ford weather station would both be affected to approximately the same degree of wind from the south west, and therefore if south west winds do not provide the major rainfalls for either station it could be assumed that the rainfall difference between Geelong and the Ford station are due to local affects.

To determine the relative proportions of the wind from all directions that have brought rain simultaneously to both stations, the percentage wind directions were calculated from the data obtained from both sources. This is shown in Table 1.

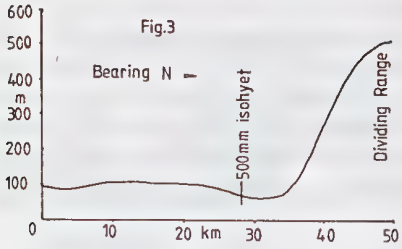
Table 1
Total amount of rainfall recorded for each direction of wind at the Ford during the period Aug. 1973 to July 1976.

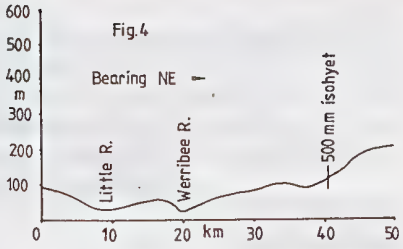
Wind direction	Rainfall (mm)
N	115.8
NE	112.4
E	19.8
SE	147.8
S	304.8
SW	394.2
W	289.1
NW	286.0

To establish whether fluctuations in annual rainfalls at locations surrounding the Werribee Plains were consistent, records for identical years were obtained. These data from eight stations are compared in Fig. 2 covering the ten years 1900 to 1910 inclusive. All these stations recorded rainfall for the full year over this 10 year period and therefore are directly comparable. A number of records from other stations were excluded because the records were not complete for all corresponding years.

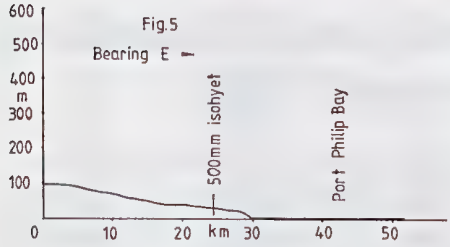
Using the Ford station as the locus, the eight major compass bearings were used as base lines for topographic elevations along the respective lines. These are shown in Figs. 3 to 10. The elevations are exaggerated with respect to the distance in order to facilitate comparison of the topography in each direction. The distances were taken to a maximum of 50km from the Ford station, with the exception of the south west bearing. Because this bearing covered the Otway Ranges which are of major significance, it was extended to 160km.

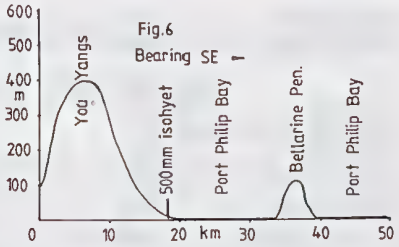
Data of the prevailing wind direction during periods of rainfall occurring simultaneously at both the Ford station and the Geelong station, were compiled from the Ford station records and the weather information published in the local press. These are summarized in Table 1. The percentages indicate the relative proportions of rain-bearing winds over the period covered by the Ford station records. In addition, from the Ford station records, the total rainfall occurring during times of specific wind direction were extracted for the period covered by the recordings. This indicates the proportions of rainfall occurring for each respective direction of wind and is tabulated in Table 2.

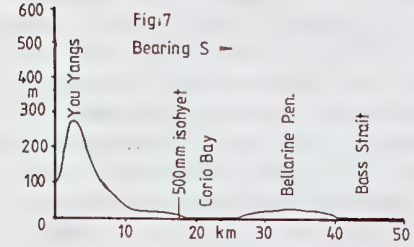


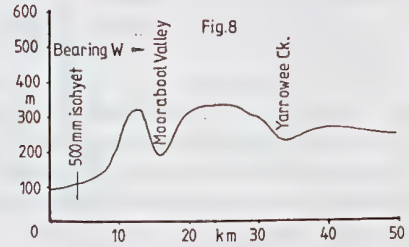


Elevation vs.distance from the Ford Weather Station.









Elevation vs. distance from the Ford Weather Station.

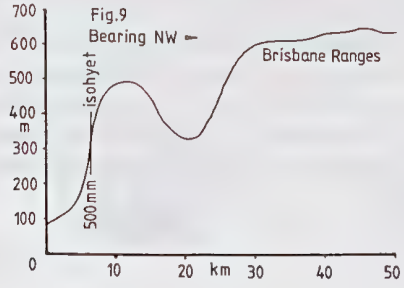
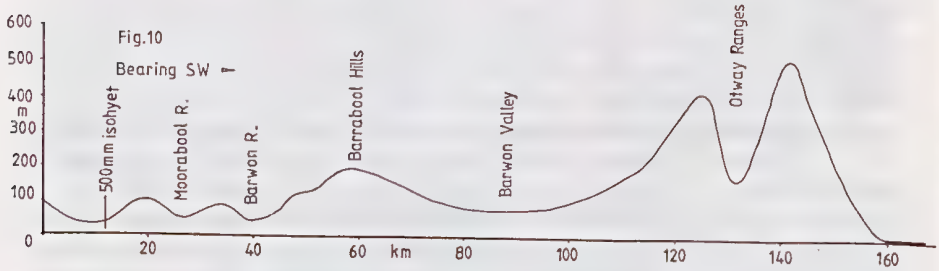


Table 2
Details of rainfall & recording stations in areas surrounding the Werribee Plains

Station	Direction from the Ford Stn.	Height above mean sea level (m)	Average annual rainfall (mm)	No. of years recorded
Bacchus Marsh	N	105	517.7	54
Ballan	N	507	729.0	37
Laverton	E	8	553.5	31
Werribee	E	24	508.5	63
Little River	SE	123	485.4	53
Portarlington	SE	15	596.4	51
Lara	S	16	467.9	48
Geelong	S	28	519.4	65
Queenscliff	S	28	625.1	39
Bannockburn	SW	121	494.3	45
Winchelsea	SW	86	523.5	56
Durdidwarrah	NW	369	662.2	58
Meredith	NW	346	682.8	61



Elevation vs. distance from the Ford Weather Station.

Fig. 11 Typical average synoptic conditions when rain occurs on the Werribee Plains.

To establish what are the dominant types of weather pattern that bring rain to the subject area the local press was researched for synoptic weather charts compiled for those days or periods during which rainfall was recorded at the Ford station. Naturally a wide variation of detailed synoptic data was found, but overall patterns emerged and could be reduced to three basic patterns that can be considered as average conditions most likely to produce rainfall on the Werribee Plains. These three patterns are shown in Fig. 11.

to be continued

Dave King
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Unusual Kleptoparasitism By Silver Gull Toward Pelican

by Michael Weston

An unusual observation of kelptoparasitism by a Silver Gull, *Laurus novaehollandiae,* on an Australian Pelican, *Pelecanus conspicillatus,* was made while conducting fieldwork as part of research into the behavioural ecology of Pied Oystercatchers, *Haematopus longirostris.* The observation was made around June 1991 in *The Spit* lagoon at the Werribee Sewage Treatment plant. The Silver Gull was perched on the mantle of the Pelican as it swam along foraging. On several occasions the Pelican procured a food item, and the Gull made a short flight to the Pelican's bill and attempted to "steal" some food. None of the kleptoparasitic attacks were successful. After each attempt the Gull would return to the Pelican's back. The Gull's posture was similar to the posture displayed by the male Silver Gull when attempting to mount an uncooperative female; the wings varied from partially to fully outstretched (presumably to maintain balance), the posture was erect with a slightly extended neck. The Pelican did not display overt aggression towards the Gull. This behaviour is interesting particularly when considering the fact that Pelicans are known to attack, kill and eat juvenile and adult Silver Gulls (Marchant & Higgins 1990. *Handbook of Australian, New Zealand and Antarctic Birds.*) This suggests that the potential cost of such kleptoparasitic behaviour would outweigh any benefit conferred by the apparently meager success rate. Silver gulls at Werribee are known to kleptoparasitise Oystercatchers and other birds (pers. obs.) but such extreme behaviour does not appear to have been recorded previously.

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An Endemic Non-Marine Mollusc of Tasmania - *Bothriembyron Tasmanicus (Orthalicade)*

By Dave King

During a visit to Tasmania in early in 1992 a few days were spent on the east coast in Coles Bay, at the head of the Freycinet Peninsula. It was here that a specimen of mollusc not before seen by the writer, was observed in a Tea Tree close to the beach. Casual examination and reference to the literature suggested it was of the Orthelicidae family.

A closer examination revealed it to be *Bothriembyron tasmanicus.* A medium size mollusc, this specimen being 16mm overall, but apparently can reach 30mm. The shell had five whorls, the body whorl being relatively large with a correspondingly wide aperture. Colour is basically a dark yellow with striations of horn colour, together with a slight amount of off-white patches. Sculpturing is not prominent, consisting mainly of growth lines.

B. tasmanicus is found only along the east coast of Tasmania, from Maatsuyker Island in the south to the Piper River in the North, Turner, 1992.

A closely related species, *B. mastersi,* is confined to limited areas of South Australia, Kangaroo Island and York Peninsula, with most of the species in this family being found in southern Western Australia. (Smith & Kershaw, 1979).

Acknowledgements

I thank Elizabeth Turner, of the Tasmanian Museum and Art Gallery, for confirming my identification of B. tasmanicus.

References

Smith, B.J. & Kershaw, R.C. 1979. Field Guide to the Non-Marine Molluscs of South Eastern Australia, A.N.U. Press, Canberra.

Turner, E., Pers. comm.

Bothriembyron tasmanicus

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PROGRAM 1992

SEPTEMBER

1	General meeting: "Frogwatch" - Gerry Marentelli
8	Plant Group Meeting: "Unusual Australian Plants"
20	Excursion: Belmont Common – Frogs, Bugs, Birds and Plants for Beginners & Experts. Leaders: Gordon McCarthy (Ph: 431826) and Dave King (Ph: 593023)
22	Bird Group meeting: "Oystercatchers" – Mike Weston
26	Plant Group excursion: Bellarine Railway Reserve

OCTOBER

6	General meeting: "Grampians Flora" – Roger Elliott
13	Plant Group meeting: "Belmont Common Vegetation" – Leila Ramsay
16/18	Western Victorian Field Naturalists Clubs Assoc. – Campout: Mt. Eccles.
18	Excursion: The Otways in the Spring – Leader: Ian Hunt (Ph: 481317)
25	Plant Group Excursion: Brisbane Ranges
27	Bird Group Meeting: "The Spotted Nightjar" – Bill Flentje

NOVEMBER

3	General meeting: "Whales & Dolphins I have known" – Cor Lenghaus
10	Plant Group meeting: "Brisbane Ranges Flora" – Geoff Gayer
15	Excursion: Serendip Sanctuary & Kevin Hoffman's garden, Lara. Leaders: Joyce Ward (Ph: 442899) & Clare McCormack (Ph: 437047)
21/22	Campout: Clarkesdale Bird Paddock – Rocks, Birds & Plants. Leaders: Graeme Tribe (Ph: 552302) & David Taylor (Ph: 03 7414712)
24	Bird Group meeting: "Gulls & Ibis at Winter Swamp, Ballarat" – Barry Kentish
26	Plant Group excursion: Bells Beach

DECEMBER

1	General meeting: Members night. Christmas Casserole Tea - 7.30 p.m. start.
5	Plant Group excursion: Barwon Downs
8	Plant Group meeting & excursion: Ocean Grove Nature Reserve

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